

The Resource

for Environmental Education in Missouri

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Taking Action To Make a Difference

by: Syd Hime
Environmental Education Coordinator
Missouri Department of Conservation

From the beginnings of Arbor Day in 1885 through the inception of Earth Day in 1970, students across the nation have been taking action to make a difference for the environment. Environmental action projects get students involved in tackling an environmental issue or problem with the goal of improving their community. An action project can result in the enhancement of outdoor habitats or the restoration of natural areas. It can also influence changes in laws and regulations and the way companies conduct their operations. Most importantly, effective action projects educate people about complex environmental issues and help them make responsible choices.

Educators find that taking part in action projects can help students develop a strong environmental ethic, increase their sense of personal worth and reinforce their competence. Students also benefit from these experiences by gaining a better understanding of their own value systems as they examine their feelings and positions on a range of issues. The cooperative learning and critical thinking skills inherent in environmental action projects can build students' confidence and self-esteem while improving their decision-making skills.

As an added bonus, action projects can achieve important education goals by providing connections between diverse subject areas. Science and social studies are at the core of most environmental action projects. Math comes into play as students' record and analyze real-life data. Language arts are interwoven as students express their point of view through writing and debate, while performing arts can be connected through an educational play.

People feel more confident about getting involved if they have confidence that their efforts will make a difference. As an educator, your challenge is to present project possibilities focused on real-life issues in ways that tap into students' passion, enthusiasm and desire to be part of a team. The key is to keep it simple and always focus on the goal: **taking action** to make a difference. Effective action projects are the result of being prepared, positive, respectful, and persistent while welcoming change.

Your efforts and your students' actions will make a difference in how young people feel about their community, their relationship to the environment and the quality of life for themselves and future generations.

What's in it for you?

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An entire issue devoted to
Taking Action

Forest Action

Renewing A Renewable Resource

by: Syd Hime
Environmental Education Coordinator
Missouri Department of Conservation

From habitat to houses and food to fuelwood - Missouri's forests provide a plethora of resources. Lying on the western edge of the Central Hardwood Region, Missouri's forests cover about 14 million acres, or roughly one-third, of the state. Historically that number was much higher, with nearly 30 million acres of forest covering two-thirds of the state.

Between 1821 and the early 1900s, nearly all of Missouri's forests were cut. Timber harvesting along larger streams, such as the Gasconade, began as early as 1818. Acres of trees became cords of fuelwood and were floated down river to St. Louis to meet the demands of the popular steam-driven riverboats. Timber cutting in the mid-1800s was two-thirds pine and only one-third hardwoods. This trend shifted in the early 1900s as the deep Ozark forests began to be exploited. Following the Civil War, lumber was needed to rebuild the nation and the coinciding expansion of the railroads created a demand for both fuel and ties. Saw mills of all sizes sprung up in the hollows of the Ozarks. The Current, Jacks Fork and Black rivers were used to transport the harvests of the Ozark mills. At the turn of the 20th century, the Missouri Ozarks comprised one of the largest timber producing regions in the nation.

By 1920, Missouri forests were depleted. Along with the loss of timber came a decline in forest wildlife populations, including deer and wild turkey, and a degradation of the Ozark waterways. A change for the better came about in 1937 when the Department of Conservation was established and forestry management became part of their mission. In the last thirty years, the state has witnessed a gain of more than one million forested acres. Missouri forests are growing 2.3 times faster than they are being harvested. Half of the state's forests are less than 50 years old and only 10 percent exceed 90 or more years

of age. Most of Missouri forests are in private ownership with only 15 percent owned by public agencies.

A variety of products are gleaned from this renewable natural resource including crates, Christmas trees, flooring, furniture, gunstocks, lumber, mulch, pulp and paper products, railroad ties and veneer. With wise forest management, Missouri woodlands will continue to produce essential products, prevent soil erosion, protect stream quality, support wildlife and provide outdoor recreation opportunities.

Wise forest management benefits from programs like the Missouri Forestkeepers Network. This forest health monitoring program provides valuable information about the condition of trees and forests. Volunteers enrolled in the program select an area they would like to monitor and are provided a free starter kit with tools and techniques to help them assess the health of trees based on condition of the crown, branches, foliage and trunk. Participants can also make use of the Forestkeepers Academy. The Academy is a structured web-based learning tool that allows a member to work toward progressively higher certification. Correlated to the Show-Me Standards, this free, volunteer program is one way students can **take action** to care for Missouri trees.

Recipe for Action

Combine one bunch of students with equal amounts of solid planning, positive attitude, and creative thinking. Fortify mixture with dashes of guidance (as needed) and allow it all to blend. As excitement comes to a boil, add liberal quantities of encouragement. Throw in pinches of patience, flexibility, and persistence at regular intervals, and sprinkle entire combination with an atmosphere of fun. When recipe bears fruit, share results with others. Serves all involved - and serves them well. Continues to serve indefinitely.

From: Project Wild, "Taking Action"

Aquatic Action With Stream Teams

by: Sherry Fischer
Stream Team Biologist
Missouri Department of Conservation

The state of Missouri is rich in water resources, with over 56,000 miles of free-flowing streams. Missouri Stream Teams strive to support the proper management of these waterways. Collectively, Stream Team members learn to monitor water quality on a geographic scale far beyond what government agencies can do. They also work to plant trees, stabilize stream banks, and improve fish and wildlife habitats in or near streams. Currently we have over 2000 Stream Teams in the state. Did you know that twenty-five percent of these teams are made up of school groups? Many schools have found that forming a Stream Team helps them accomplish their learning objectives. High school students in particular are perfectly suited for a full Stream Team experience.

One of the most popular activities is water quality monitoring. The Stream Team program offers multiple levels of monitoring training. Teams can attend as much or as little of this training as they like and each group determines its level of involvement. The introductory training class concentrates on watershed survey/inventory and biological monitoring (looking at water bugs to determine water quality). Specifically, finding aquatic insects sensitive to water pollution indicates good water quality. By continuing through more advanced courses, teams can add chemical monitoring to their repertoire. However, members don't have to perform all of the tests on each monitoring trip. Teams can determine how much they want to accomplish and select the activities necessary to meet their objectives. Many school groups integrate monitoring activities into their current classroom curriculum.

Two of the program's sponsors, The Missouri Departments of Conservation and Natural Resources, maintain an extensive database of information that has been collected by Stream Team volunteers. This data is used along with agency data to collect baseline information and determine where further testing is needed. The data collected by Stream Teams is a viable component in determining the health of Missouri streams. For example, when a fisheries biologist began finding problems with

catfish populations in northwestern Missouri streams, the only water quality data available had been collected by Gallatin High School's Stream Team. This data was very important in validating water quality conditions in the watershed.

It's easy to start a Stream Team at your school. Registration forms, program information and activity ideas can be found at www.mostreamteam.org or by calling 800/781-1989. Water quality monitoring is only one of the many activity choices. Depending on what your adopted stream needs and what you'd like your group to learn about, your team could select other projects, such as litter pickup, tree planting, storm drain stenciling, or local stream advocacy. Biologists are available to assist, but your teams design their own programs. Think about **taking action**; get your high school group involved. They'll never look at streams the same way again!



Habitat Action

by: Barb Byrne
Editor
Missouri Department of Conservation

Habitat loss is the number one reason for the population decline of our plants and animals. One way to help slow this decline is by **taking action** through habitat gardening. Habitat gardening involves planting and creating wildlife-friendly space that provides the basic elements of food, water, cover and nesting areas. You can create habitat just about anywhere. You could put up a birdhouse in your yard or put some planted flowers on your balcony or in a window box. You don't need a lot of space.

Many natural butterfly habitats have been lost due to urbanization and agricultural development. In addition to being beautiful, butterflies are important agents in the pollination of flowers and indicators of a healthy environment. Building a butterfly garden would be an easy way both to see more of these attractive insects and to contribute to their conservation. It is easy to increase the number and variety of butterflies in your yard. Simply grow plants butterflies like to eat! Using their long, tube-like mouths, butterflies feed on the nectar found in bright, colorful, fragrant flowers. Some good plant choices native to Missouri are butterfly milkweed, columbine, goldenrod and aster. Unlike adult butterflies, caterpillars chew on plants. Be sure to plant some of their favorites too, including pipe-vine, violets, pussy willows, parsley and nettles. Many

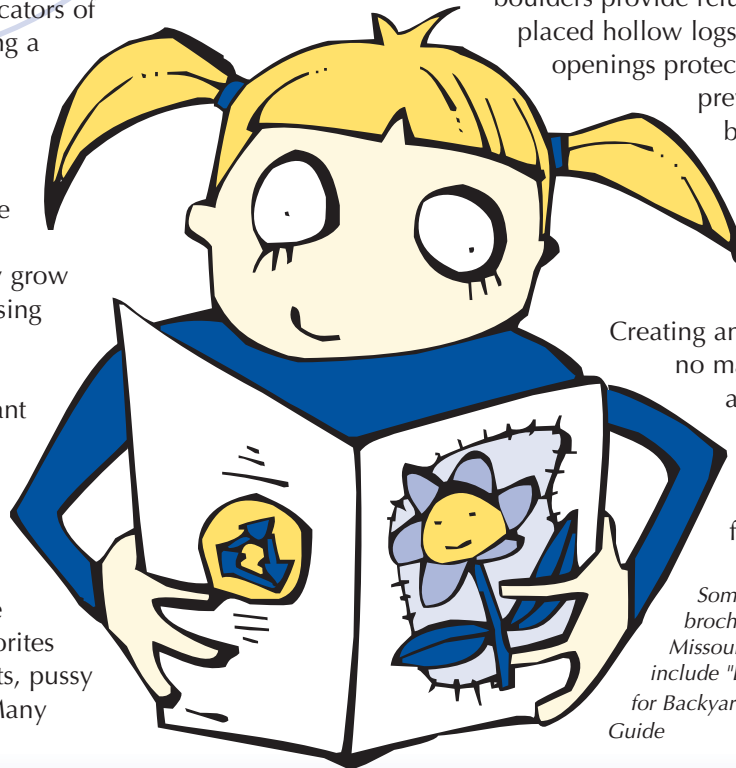
websites provide comprehensive charts of plants that attract butterflies. The Grow Native website, <www.grownative.org>, has a series of landscaping plans for smaller scale plantings using native plants.

To attract birds to your garden, you'll need a variety of food sources. Growing plants of differing heights, from trees to groundcover plants, will create a greater variety of food sources, nesting sites and protective cover, and your garden will attract a greater variety of birds. Native species that will attract songbirds include Missouri primrose, prairie clover, purple coneflower, wild geranium, New Jersey tea and deciduous holly.

A garden pond attracts frogs and other native wildlife and supplies water for the birds. Half-buried stones and boulders provide refuge for lizards. Strategically-placed hollow logs and nesting boxes, their openings protected from direct sunlight and prevailing winds, encourage birds and perhaps possums to take up residence until trees and shrubs have developed enough to provide natural nesting sites.

Creating and enhancing wildlife habitat, no matter how small the space, is a challenging endeavor – but one well worth it for the rewards to us and the benefits to our wildlife friends.

Some helpful habitat gardening brochures available free of charge from the Missouri Department of Conservation include "Butterfly Gardening," "Landscaping for Backyard Wildlife," and "Grow Native: Guide"



Did You know?

- Recycling all of your home's waste newsprint, cardboard, glass, and metal can reduce carbon dioxide emissions by 850 pounds a year.
- Recycling an aluminum can saves enough energy to run a television set for three hours or to light one 100 watt bulb for 20 hours.
- It is estimated that 150 million computers will be discarded in the United States alone, enough to fill a hole one acre in area and 3.5 miles deep.
- Five recycled plastic bottles make enough fiberfill to stuff a ski jacket.

Consumer Action

Choosing Wisely

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by: Barb Byrne & Syd Hime
Outreach & Education
Missouri Department of Conservation

How do the choices you make everyday affect our environment? What happens to your Nike tennis shoes when they get worn and dirty or the Tommy Hilfiger jeans you don't like anymore? What happens to the napkins and paper cups you and your friends throw away at lunch? Where does the boom box go when you get that new CD player? Most times those items end up in the trash. And most trash ends up in a sanitary landfill.

A sanitary landfill is a site where solid waste is disposed of on land without creating public health or safety hazards, by confining refuse to the smallest practical area, reducing it to the smallest practical volume, and covering it with a layer of earth at the end of each day's operation or more frequently if necessary. Missouri currently has 25 active permitted sanitary landfills, located in 21 counties.

If you added up all the waste from your house, from the store where you shopped and from the restaurant where you ate, it would amount to over 4 pounds per person of solid waste thrown in the trash every day. On the larger scale, in the calendar year 2001, Missourian's generated 10,607,167 tons of solid waste. This tonnage represents all waste that is disposed of in the state's sanitary and demolition landfills as well as waste that goes to other states through Missouri's transfer stations.

But the amount of natural resources we throw away every day is even less obvious. Our trash contains energy to heat thousands of homes each year and tons of glass, metal and plastic that could be reused. We need to develop ways to ecologically and economically conserve and fully utilize our natural resources. Part of the answer lies in the three R's – Reduce, Reuse, Recycle. The practice of recycling is growing among Missouri consumers. Of the waste generated in 2001, 2.61 million tons were recycled. Communities providing recycling service increased from 154 in 1992 to 403 in 2000. Reduction is also gaining popularity among consumers, with Missourian's reducing their per capita disposal of solid waste from 1.33 tons in 1990 to 1.11 tons in 2001.

By making wise choices, you too can get on the 3-R bandwagon and make a positive impact on your environment. So exactly what can YOU do?



Reduce – Produce less waste by shopping wisely. Instead of the six- or twelve-pack of soda, get the two-liter bottle and drink from a glass. Avoid over-packaged goods, especially ones packed with several materials such as foil, paper and plastic. Buy durable goods and avoid disposable items. Look for products in reusable or recyclable containers. Buy the family size bag of chips instead of single servings.

Reuse – Salvage soda bottles, old furniture, clothes, tires, envelopes and cardboard boxes to use again. Use Mom's checkbook box for pencils or crayons. Make bookmarks from construction paper scraps. Roll toilet tissue cores in peanut butter and seeds and put them out for the birds. Collect and store seeds in egg cartons. Turn decorated plastic jugs into banks. Use resealable containers instead of plastic wrap. Reuse grocery bags or bring your own cloth bag to the store.

Recycle – You know newspaper can be recycled into paper bags, egg cartons and cardboard, and glass and aluminum can be made into new containers. But did you know that cooking oils and meat fats can be made into cosmetics, and plastic into artificial lumber, carpeting and winter jackets? Buy products that are made from recycled materials and also from material that is collected for recycling in your community. Composting of food scraps and yard wastes is also an important way to recycle. Composting creates nutrient-rich mulch you can use to fertilize soil in your garden or yard. Instead of bagging all those fallen leaves and grass clippings, build a compost pile and spread the decomposed material on vegetable and flower gardens.

Talk to your teachers, your family and your friends. Make suggestions and plans for how you can work together to conserve the rich resources of your home and community. And then **take action** – put your plan to work!

Consumer Challenge:

Recycling Computers

by: Barb Byrne
Editor
Missouri Department of Conservation

Computers and other electronic devices are becoming more prevalent in private homes and educational environments every day. Their value in educating both adults and children is undeniable. The question of what to do with these devices when they become obsolete presents an environmental challenge. This challenge represents an opportunity for parents, teachers and students to become aware of environmental issues and develop environmentally-friendly solutions in their communities.

Consumers need to avoid disposing of computer and related equipment in garbage bins or local landfills. Many of us are unaware that several harmful toxic elements and chemicals go into the manufacture of computer parts. Cathode ray tube (CRT) monitors each contain an average of 4 pounds of lead – a highly toxic metal – embedded in the glass. As long as the monitor is in use, this lead is not a problem. However, when a computer ends up in a landfill, the CRT is broken into pieces and the lead can get into the environment. Lead can have toxic effects on the human nervous system and cause brain damage in children. It can poison ground water, which in turn can poison plants, people, animals and micro-organisms. Lead is only one of the hazardous components that go into making a computer. Other toxic metals like Cadmium, Selenium and Mercury are also a part of the problem.



Instead of sending your obsolete electronic to the landfill, **take action** to make a difference and look for a local organization that recycles electronics. Many of them can be found through the National Safety Council. In some communities, Goodwill Industries and the Salvation Army are set up to receive equipment which they repair, resell or send to the state contractor for recycling. You can also contact the Missouri Department of Natural Resources at 800/361-4827 for list of computer recyclers.

Many computer companies are now working on programs to take back the equipment they sell, so that it can be reused or disposed of properly. But until all companies become environmentally responsible, we consumers will have to do our part to keep computers and other electronic devices from harming the environment.

Make a Difference

Donate Used Cell Phones

Don't throw away your old cell phone. The Wireless Foundation reprograms old cell phones to dial 9-1-1 at the push of a button and gives the phones to domestic abuse victims so they can call for help free of charge. For more information, visit www.donateaphone.com.

CHALLENGE

- List four items you use that aren't essential to your survival. What impact does their production or disposal have on our environment or economy?
- Collect and discuss examples of objects that can be reused in ways different from their original purpose. Create a usable item from something you were planning to throw away.

Project Resource Guide - Taking Action To Make a Difference

Start your students on the path of **taking action** to make a difference with these interdisciplinary, hands-on, easy-to-use activities from Projects WILD, Learning Tree, and WET. To receive these outstanding education materials, along with their Show-Me Standards correlations, attend the next training workshop in your area. Contact the coordinators listed for more information.

Project WILD

No Water Off a Duck's Back – Page 274, 2001 Edition Page 307 – Identify ways oil spills can adversely affect birds; describe possible negative consequences to wildlife, people and the environment from pollutants caused by humans. (Grades 5-12).



Playing Lightly on the Earth – Page 292, 2001 Edition Page 432 – Distinguish between games that are damaging and not damaging to the environment; invent games with a benign effect on the environment. (Grades PreK-8).

Litter We Know – Page 50, 2001 Edition Page 434 – Identify and evaluate ways that litter pollution can endanger wildlife; propose ways to help eliminate these dangers to humans and wildlife. (Grades 4-8).

Sustainability: Then, Now, Later – 2001 Edition Page 436 – Define the different components of a sustainable community; relate the effects of individual actions on the long-term health of the environment; explain how communities can become sustainable. (Grades 9-12).

Enviro-Ethics – Page 326, 2001 Edition Page 450 – Distinguish between the actions that are harmful and beneficial to the environment; evaluate the appropriateness and feasibility of making changes in behaviors related to the environment. (Grades 5-12).

Aquatic WILD

Something's Fishy Here! – Page 176, 2001 Edition Page 145 Identify potential cause-and-effect relationships involving aquatic-related pollution; generate and evaluate alternative solutions to problems of aquatic pollution; outline a plan to reduce the consequences of possible aquatic pollution in their communities. (Grades 2-8).

Plastic Jellyfish – Page 170, 2001 Edition Page 136 – Describe the potential effects of plastic waste on aquatic wildlife and habitat; identify specific actions to remedy the problem. (Grades K-12).

Project Learning Tree

Renewable or Not – Page 43 – Identify renewable, nonrenewable, perpetual, reusable, and recyclable resources and explain the differences among them; play a game that simulates society's use of renewable and nonrenewable resources. (Grades 4-8).



Pollution Search – Page 114 – Identify forms of pollution and describe the effects that various pollutants can have on people, wildlife and plants; describe relationships between various forms of pollution and human actions. (Grades PreK-6).

Talking Trash, Not! – Page 119 – Analyze the solid waste generated over a period of time; describe what happens to various types of waste when it's discarded; develop and implement a plan for reducing the amount of waste generated. (Grades 1-6).

Reduce, Reuse, Recycle – Page 320 – Learn about ways to reduce solid waste in the community by reducing consumption, reusing products, recycling materials and composting; communicate to others the importance of recycling in their community. (Grades 4-8).

For information on Project WILD and Learning Tree workshops and materials, contact Bruce Palmer, State Coordinator, Missouri Department of Conservation, PO Box 180, Jefferson City, MO 65102-0180, 573/751-4115 x3113, <palmeb@mdc.state.mo.us>

Project WET

The Pucker Effect – Page 338 – Students observe how ground water transports pollutants and simulate ground water testing to discover the source of contamination. (Grades 6-12).



Sparkling Water – Page 348 – Students develop strategies to remove contaminants from wastewater. (Grades 6-12).

For information on Project WET workshops and materials, contact Joe Pitts, State Coordinator, Department of Natural Resources, PO Box 176, Jefferson City, MO 65102, 800/361-4827, <nrpittj@mail.dnr.state.mo.us>

The Library

Conservation and Environmental Education Resources

Web Resources

Charity America

<<http://www.charityamerica.com>>

Provides a vehicle for donating used computer equipment and electronics.

Earth Day Energy Fast

<<http://www.earthdayenergyfast.org>>

Descriptions of actions that can be taken – both indoors and out – for Earth Day and everyday.

Earth Day Groceries Project

<<http://www.earthdaybags.org>>

A cost-free environmental awareness project in which students decorate paper grocery bags with environmental messages for Earth Day.

Enchanted Learning

<<http://www.enchantedlearning.com/crafts/arborday>>

Contains instructions for a number of craft activities related to Arbor Day.

Grassroots Recycling Network

<http://www.grn.org/kids_recycle/overview.html>

Provides students, teachers, school administrators, local recycling coordinators and community activists with the tools that have been developed by their peers to achieve zero waste in their K-12 school systems. Identifies high quality web-accessible information resources.

Keystone Science Network – Environments, Habitats and Ecosystems

<http://keystone.fi.edu/cc_ehe/eheenrich.shtml>

Information about starting a school habitat garden, composting for kids and other activities and experiments.

Kid's Domain

<<http://www.kidsdomain.com/holiday/earthday>>

Online games, songs, coloring pages and activities for kids in celebration of Earth Day.



Share the

Technology - Computer Recycling

<<http://www.sharetechnology.org>>

A searchable computer donation database which provides a way for donors and potential recipients to connect anywhere in the country.

The Imagination Factory

<<http://www.kid-at-art.com>>

Ideas for creative ways to recycle by making art.

The Green Squad

<<http://www.nrdc.org/greensquad/default.htm>>

Gives kids the tools and skills they need to help locate and solve environmental and health problems in their schools. Designed primarily for students in fifth through eighth grade, but offers information for younger and older students as well.

The National Arbor Day Foundation

<<http://www.arborday.org/programs/teachingYouth.html>>

Classroom activities, games and tree information for students. Information on contests and a "mystery tree challenge."

The Quest for Less

<<http://www.epa.gov/epaoswer/osw/kids/quest/index.htm>>

The Environmental Protection Agency's site of activities and resources for grades K-6.

Wilderness Society's Earth Day Web Site

<<http://earthday.wilderness.org/teachers>>

Curriculum activities for grades 4-6 with downloadable PDF files. Classroom activities for Pre-K through high school.

Publications

The following publications are available by contacting Bruce Palmer, Missouri Department of Conservation, 573/751-4115 x3113 or <palmeb@mdc.state.mo.us>.

Project Learning Tree Green Works

A step-by-step guide to connecting community action and service-learning. Includes sample projects, worksheets, activities and resources.

Taking Action

A complete educators' guide to involving students in environmental action projects. Includes action success stories, ideas for integrating action into teaching and a comprehensive list of resources.

The following publications are available from Acorn Publications, PO Box 2423, Tustin, CA 92781-2423, 800/422-8886 or <<http://acornnaturalists.com>>.

The Life Cycle of Everyday Stuff

Reeske. Activity book shows teachers how to transform common items like a phone into fascinating investigations of the flow of energy and matter on Earth. Creative approach to studying waste issues and recycling technologies. Grades 8-12. #EE-10163 (\$19.95)

Profiles: Environmental Pioneers

Byrnes. Engaging, lively portrayal of nine environmentalists who strove to make earth a better place to live. Provide a positive framework for understanding today's major conservation concerns. Ages 10-17 #EE-6704 (\$19.95 hardcover)

Ghost Bat in a Gum Tree

Tiffault. This environmental counting book introduces the concept of saving endangered species and celebrates Earth Day by highlighting twelve endangered animals. Ages 5-9. #B-7092 (\$9.95)

Consider the Earth, Environmental Activities for Grades 4-8

Gates. Includes inquiry-based learning experiences covering the ecological principles of water, soil, wildlife, plants, ecosystems, weather, oceans, and environmental issues such as global warming, hazardous wastes, over-population, and air pollution. #EE-8033 (\$26.95)

Global Warming and the Greenhouse Effect

Students build a greenhouse model of the atmosphere and conduct simulation games and carbon dioxide gas release experiments using baking soda and vinegar. Students also hold a conference on global warming and learn that environmental problems can be viewed from several different perspectives. Grades 7-10. #GEMS-2816 (\$20.95)

Videos

Bullfrog Films

<<http://www.bullfrogfilms.com>>

One of the leading US publishers of independently-produced, environmental videos for purchase or rent. Titles include: **It's Gotten Rotten** – a 20 minute video on composting; **Going Green How to Reduce Your Garbage** - a step-by-step guide to reducing the "unfriendly" impact of your household on the environment; **Here's My Question: Where Does My Garbage Go?** – a 26 minute video field trip to a landfill and a recycling plant; **A Crack in the Pavement** - a two-part video series showing children, teachers and parents how they can make positive changes in their communities.

Media Loan

You may borrow the following items by contacting our Media Librarian at 573/751-4114 x3837, fax at 573/751-2260 or writing to: Media Librarian, Missouri Department of Conservation, PO Box 180, Jefferson City, MO 65102-0180.

Guarding Our Living Environment

Upper Elementary-Adult/ 26 minute video

A narrative by Marlin Perkins opens this story about a modern conservation department's mission to keep people in harmony with the environment through wise use and management of our natural resources.

Wasted Waters

Junior High-Adult/ 13 minute video

A look at one of our oldest problems...water pollution.



EE Calendar

Check It Out

<www.conservation.state.mo.us> has up-to-date information on the Department of Conservation's educator workshops. This year there are over 70 workshops being offered. There's something for everyone!

May 7-30

Big River Cleanups & Education Workshops

Various locations in Missouri, Illinois and Iowa
Learn how hundreds of tons of trash are being collected and removed from our BIG Rivers.

Contact: Bryan Hopkins, DNR, 800/361-4827

March 1 - May 31

Great American Cleanup

Locations throughout Kansas City
A grassroots beautification, litter prevention and community improvement project coordinated by Keep Kansas City Beautiful with Kansas City neighborhood associations, schools, businesses, community organizations and governments.

Contact: Julie Macaulay 816/561-1061 or julie@bridgingthegap.org

April 26

Earth Day Walk and Party for the Planet

Kansas City Zoo

10:00 am - Earth Day Walk Starts

9:00 am to 5:00 pm - Party for The Planet

Fee: \$10 for adults, \$5 for kids, children under 3 free

Take a morning stroll through the zoo and help raise money for local environmental programs in Kansas City. After the walk, enjoy Earth Day games, crafts, live entertainment and more.

Contact: Leslie Barland, 816/561-1061 or leslie@bridgingthegap.org

June 13, 20 & 27

Exploring Animal Behavior

Saint Louis Zoo

9:00 am – 2:00 pm

What's an ethogram? What's a focal animal? How do scientists determine how and why animals do the things they do? Take part in this workshop orientation to the "Exploring Animal Behavior" curriculum and have your students conduct their own animal behavior research at the Zoo.

Contact: Amy O'Brien, WA University Science Outreach, 314/935-6846.

June 16-20

Vertebrate Groups and Classification

Saint Louis Zoo

8:30 am - 4:30 pm

A great opportunity for teachers of grades 1-5 to gain both knowledge and skills surrounding the major science concept of classification.

Contact: Education Department, 314/781-5466

June 23-25

Stream Environments

Presley Conservation Education Center, near Eminence

Fee: \$30

Course focuses on ecology and hydrology of Missouri streams and includes a one-day float trip.

Contact: Joe Pitts, DNR, 800/361-4827

June 24-26

Animal Adaptations and Behavior

Saint Louis Zoo

Times vary each day

An introduction to the myriad ways animals survive and thrive in our complex world. For K-8 grade teachers.

Contact: Education Department, 314/781-5466

June 25-27

Groundwater Issues

Jerry J. Presley Education Center, near Eminence

Fee: \$30

Topics include geology and hydrology through visiting Grand Gulf State Park, Mammoth Spring, and other venues.

Contact: Joe Pitts, DNR, 800/361-4827

June 30 - July 3

Wildlife Biology

Saint Louis Zoo

8:30 am - 4:30 pm

Teachers of grades 7-12 will discover how biologists do the things they do. Hands-on classroom and field activities will have you censusing populations, determining levels of biodiversity, and learning the techniques for conducting your own biological research.

Contact: Education Department, 314/781-5466

July 8-11

Missouri River: Conservation and Culture

Jefferson City

Fee: \$45

A study of the habitat and history of the lower Missouri River with emphasis on the Lewis and Clark Expedition.

Contact: Joe Pitts, DNR, 800/361-4827 or Elaine Callaway, MDC, 573/635-9824

July 13 - July 18

Investigating and Evaluating Environmental Issues and Actions*

Presley Conservation Education Center, near Eminence

Fee: \$30

Teams of 3-4 will use internationally recognized program to investigate local environmental issue. Activities include developing surveys and organizing and interpreting primary data.

Contact: Jim Lubbers, DNR, 800/361-4827

July 16-17

Spineless Wonders: The Amazing World of Invertebrates

Saint Louis Zoo and Butterfly House

July 16, 8:00 am - 4:00 pm

July 17, 8:30 am - 4:30 pm

Teachers of grades 1-4 will focus on developing the background knowledge needed to teach younger students about the invertebrate world and the techniques required for raising butterflies, mealworms, and crickets in the classroom.

Contact: Education Department, 314/781-5466

August 2-3

Water Use Cycle*

Columbia

Fee: \$30

Explores how drinking water is produced, distributed and used; continue cycle of use through process of wastewater treatment; includes field trips to water and wastewater treatment plants.

Contact: Bryan Hopkins, DNR, 800/361-4827

August 13

To Save a Species Teacher Workshop

Saint Louis Zoo

8:30 am - 4:30 pm

Graduate credit available

This workshop for teachers of grades 7-12 is designed to prepare you to facilitate a unit on the science of managing captive populations. You will need to bring a laptop computer.

Contact: Education Department, 314/781-5466

*Category I Instructional Workshop for the Missouri Environmental Education Certification Program



Education Workshops for 2003

This year the Missouri Department of Conservation is offering over 70 workshops for educators. Topics range from Reading Nature to Children, to Earth Day Projects, to The Nature of Math and Science, to Swamp Ecology. A number of workshops are based on the Projects WET, WILD and Learning Tree and many qualify as Category I Instructional Workshops for the Missouri Environmental Education Certification Program. Some also earn graduate or undergraduate credit for the participants.

A complete listing of the workshops was included as an insert in the February 2003 issue of The Resource newsletter. You can also find the list with complete descriptions and contact information on the Department's website at www.conservations.state.mo.us.

Summer Employment at Wyman Center

Camp Wyman in Eureka

Camp Coca-Cola in Imperial

Summer Adventures Day Camp in St. Louis

Salary: \$40 to \$75 per day; two camps are residential and include room and board

Interested in a different experience for the summer? Work for Wyman Center, a nationally recognized youth development agency in the St. Louis area. Summer jobs for teachers, nurses, students and others who enjoy working with youth.

Contact: Ginny Zarinelli, Wyman Center, 636/938-5245, or ginnyz@wymancenter.org

Big River Action

For six years Chad Pregracke's team from Living Lands and Waters has worked in cooperation with local citizens and volunteers to clean up the trash from America's Big River systems. Through these efforts, over 800 tons of trash have been removed from the Mississippi, the Ohio and the Missouri Rivers. These community-based cleanup efforts have also served to educate and connect people to the national treasure these rivers represent. This May, these efforts will be expanded to include one-day education workshops on the Mississippi River. Each workshop will include activities aboard a floating classroom, boat excursions to various river sites and Big River educational materials to take back to classroom, civic groups or youth organizations.

For more information on how you can get involved in **taking action** on the Big River at the workshops listed below, contact Bryan Hopkins, Missouri Department of Natural Resources, 800/361-4827 or <nrhopkb@mail.dnr.state.mo.us>.

May:

7 – St. Louis
15 – Hannibal

13 – Louisiana
19 – Alexandria

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Mission Statement:

The Resource is published in October, December, February and April by the Office of Environmental Education. Its purpose is to provide current information on conservation and environmental education resources and events, professional development opportunities and suggestions for integrating environmental subjects into teaching.

For a free subscription or to submit information to the newsletter write to: Office of Environmental Education, Missouri Department of Conservation, P.O. Box 180 Jefferson City, MO 65102-0180.

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OFFICE OF ENVIRONMENTAL EDUCATION

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CONSERVATION CURRICULUM

Reminder

Missouri Department of Conservation 2003-2004 Outdoor Classroom Grant application deadline is April 4, 2003. If you have questions, contact Syd Hime at 573/751-4115, x 3370

Warehouse Clearance

Conservation is clearing out the warehouse! We are overstocked on several publications and we'd like to offer them to you. If you would like to get free copies of any of these, clip the form below and send to Distribution Center, Missouri Department of Conservation, P.O. Box 180, Jefferson City, MO 65102-0180, call 573/751-3630 or fax 573/522-2020.

Conservation Careers

GIS Specialist

A Geographic Information System (GIS) helps a person manipulate, analyze and present information tied to a geographic location. This information can include roads and streams which are viewed on the computer instead of on paper. How does this technology fit into the world of conservation? Simply, it is used to help manage fish, forest and wildlife resources. For example, a GIS Specialist who works for the Department of Conservation directs the design and development of aquatic GIS applications, such as a habitat classification system for streams and rivers. GIS systems can be used to analyze pollution damage such as oil spills or to monitor and model other aspects of the environment. The specialist researches the latest GIS products, distributes them to resource managers and administrators, and provides technical assistance and training to the users. A GIS Specialist may be asked to review proposed projects and make recommendations for solutions and alternatives and then customize the GIS programs and applications to fit the Department's needs. Effective use of GIS technology allows the Department to manage Missouri's natural resources more efficiently.

GIS Specialists with the Missouri Department of Conservation have graduated from an accredited college or university with a Master's degree in Geography, Natural Resource Sciences or a closely related field and have had at least three years of professional experience in planning, designing and implementing GIS projects.

_____ **Mizzou Magic (E00097).** A wealth of information to celebrate Lewis and Clark. Take a close look at their historic journey - from the boats they sailed, to the maps they made, to the foods they ate.

_____ **Conservation for Kids (E00067).** A four page activity booklet containing a word search, an "interactive" stream story, favorite Missouri symbols and instructions for making a few simple "nature-watching" tools.

_____ **Conservation for Family & Consumer Sciences (E00034).** An instructional unit designed to help middle through high school teachers integrate conservation concepts into their family and consumer sciences curriculum.

_____ **Conservation I Can Do (E00025).** Activity guide of projects for young children that can be done at home. Create forest and cave panoramas; make a water viewer; discover owl pellets.

_____ **Kids Fishing Book (E00092).** Fun-filled activity book designed to make students more aware of the need for clean water, how and where fish live and to teach responsible fishing.

_____ **Owls Booklet (E00455).** A full-size fold out brochure of Missouri's owls with color pictures and descriptions.

_____ **Wildflower Favorites (E00444).** An eight-page color booklet featuring 12 of the most popular native wildflowers now being used in landscaping projects.

_____ **Common Roadside Wildflowers (E00451).** Handy color brochure highlighting over 18 species of wildflowers found on Missouri's roadsides.

Name _____

School Shipping Address (UPS will not deliver to a PO Box number)

Bulletin Board Butterfly Habitat Garden

PreK-2

*Developed by: Barb Byrne
Outreach & Education, Missouri Department of
Conservation*

Materials

- Books about butterflies and gardening for butterflies
- Brochure E00471 – "Butterfly Gardening and Conservation" available from Missouri Department of Conservation
- Background paper
- Green construction paper
- Garden magazines
- Paper cutouts of grass, flowers, butterflies, caterpillars, worms, snakes, ants, ladybugs, etc.
- Glue/paste
- Scissors

Preparation

- Read books about butterflies.
- Talk about caterpillars and their metamorphosis into butterflies.
- Show pictures of the various life cycle stages from caterpillar to butterfly.
- Discuss what makes up a habitat for butterflies.

Procedure

1. Cover the bulletin board with background paper.
2. Have the students identify the prepared grass cutouts.
3. Guide each student through pasting strips of "grass" on the board.
4. Have the students find pictures of flowers in the magazines and cut them out.
5. Guide each student through pasting his/her flowers on the board.
6. Have the students identify pictures or cutouts of the other creatures that might be a part of the butterfly garden.
7. Guide students through pasting the pictures or cutouts in appropriate places on the board.
8. After the bulletin board is complete, discuss how the garden will operate.

Questions for Discussion

1. Where will the butterflies get water?
2. Why is the sun important to the butterfly garden?
3. What can we do to help the butterfly garden?

Supplementary Activities

Art – Provide materials for the children to draw and color pictures of butterflies and gardens during self-selected activity time.

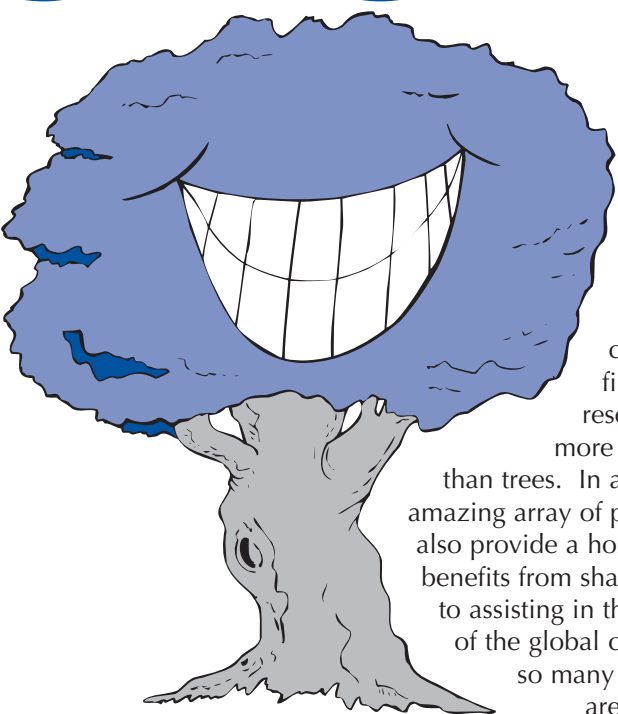
Outside – Look for butterflies in the playground area during self-selected activity time.

Outside – Choose species of flowers that attract butterflies and plant them in an outside container that children can observe from a classroom window.

Science – Provide samples of live plants that would be good choices for a butterfly garden. Children can describe the colors and textures of the plants and identify the parts.

Writing – Provide paper, pencils and crayons for children to write stories about butterflies and gardens. Allow the children to spend as much or as little time as they wish on this activity. Take their dictation as they finish their work. Bind the pictures and stories together to create a class book about butterfly gardening.





Tree-ific Trees

3-4

It would be challenging to find a natural resource that has more diverse uses than trees. In addition to an amazing array of products, trees also provide a host of other benefits from shading our yards to assisting in the maintenance of the global climate. With so many benefits, trees are deserving of some action to

recognize their importance. Students can express their appreciation of trees by carrying out any of the following activities.

Arbor Day Party

Strike up the band, invite the community and turn April 4th into a fun, festive Arbor Day party at your school.

- Dedicate a forest, a tree, or a flowerbed in a park, and make it an occasion to talk about stewardship.
- Raise money through a recycling drive to purchase trees for the school or community.
- Have a ground breaking ceremony for a new outdoor classroom.
- Fill the air with music. Have an Arbor Day concert of songs about trees or with tree names in their titles.
- Organize a poster or poetry contest.
- Create a pageant or play depicting the importance of trees.
- Make edible treats from tree products.
- Adopt-A-Tree on school grounds or in your community. Start a journal to record changes in your adopted tree throughout the year.

Plant A Tree

1. Ask students to name areas in the community where trees have been planted. In small groups have them list the benefits trees provide to people and wildlife in those areas. Combine the groups' lists to develop a class list, and add other benefits the class can think of.
2. Have students work in small groups to identify areas in the community or on the school grounds that would be improved by the presence of one or more

trees. Have them refer to the list of tree benefits as they consider different planting sites.

3. After students have identified possible sites, have a group discussion about the feasibility of each site. Develop a system for prioritizing which site (or sites) should be the focus of their tree planting campaign.
4. Assign teams to research the questions listed under **Trees in Your Community**.
5. After students have the answers to their questions, have them formulate plans for carrying out their action project. For instance, they may want to organize a fund raiser to help purchase trees or they may want to develop a tree adoption program with local businesses and citizens donating trees.
6. Designate a tree planting day or week and have student's plant trees in their selected sites. Make sure the students, or other responsible designee, will take care of the newly planted trees.

Trees in Your Community

From: Arbor Week Activity Guide, Missouri Department of Conservation

Contact your local government offices (city hall, county courthouse, etc.) to arrange for a guest speaker to visit your school or for your class to take a fieldtrip to visit them. Have students ask the official their own questions and learn the answers to these questions:

1. What department is in charge of the trees in the community?
2. How much money does this department spend each year on tree care?
3. What are the main expenses?
4. Has the community planted any trees? Where do they get their planting stock?
5. How do they decide what species of trees to select for planting?
6. How many of the trees that they planted survived?
7. What are the biggest enemies to trees in our community?
8. What can people do to help our trees stay healthy?
9. Does our community do anything to celebrate Arbor Day?

A Peek At Packaging

From: Project Learning Tree

Objectives

After completing this activity, students will be able to:

- Describe the different purposes for packaging
- Identify the pros and cons of different types of packaging
- Explore how packaging affects our decisions as consumers

Show Me Standards

Performance: 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.8, 1.9, 1.10
2.1, 2.3, 2.4, 2.5
3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8
4.1, 4.6, 4.7

Knowledge: CA1, 4, 6; FA1, 4; HP3, 6; S1, 7, 8; SS4, 7

Materials

- Samples of different kinds of packaging
- Copies of "Consumer Choices" Copy Page
- A variety of common products students brought from home, such as household cleaners, cosmetics, foods, toys, shampoo, etc.

Overview

Nearly everything we buy comes in some sort of package. Packaging, made from a variety of renewable and nonrenewable resources, is necessary to protect an item, keep it fresh, make it tamper-proof, and make the item easy to transport and store. In this activity, students will examine the pros and cons of different packaging strategies.

Background

At the most basic level, packaging is needed to hold items together in the size or amount desired for purchase. The concept behind product packaging has evolved over time, changing to fit the needs or demands of consumers as much as to fit the economic demands on manufacturers. The earliest forms of packaging employed animal skins, earthenware vessels and woven baskets. Glass bottles, fired clay amphorae and finished leather were developed between 2,500 and 3,500 years ago. Packaging as we know it in the late 20th century is relatively new, having had its start with the advent of economically efficient packaging machinery in the latter part of the 19th century.

The very nature of the products we consume dictates the kind of materials used in the packaging process. Canning certain food items and other perishables assures maximum

shelf-life and freshness; paper milk cartons or plastic jugs allow for easy pouring and storage; plastic

boxes with shrink-wrap packaging for items like compact discs allow for maximum display in a minimum amount of space; large cardboard boxes of laundry detergent help consumers purchase in bulk items that will be used often. In many instances packaging prevents contamination and provides tamper-proof protection for the consumer. Packaging also provides a convenient surface for displaying important consumer information as well as advertising space for the manufacturer.

Manufacturers and consumers have become more aware of the impact of packaging on the environment, as well as the conservation of natural resources, energy, and waste management.

Some companies are changing the materials used in their packaging; others have reduced, or even eliminated packaging of some products; still others are increasing the amount of recycled material used to make their packaging.

In many instances, the need for packaging, and the kind of materials used in packaging, is self-evident. Sometimes, however, it may be difficult to understand why a certain package has been used. Students should be prepared to ask informed questions about packaging and make responsible purchasing decisions based on an analysis of the information. The following activity will help them compare packaging practices and choose wisely the kind of products and their packages that best suit their needs as consumers.

Getting Ready

- Bring in examples of different kinds of packaging used for different purposes, such as advertising, freshness, tamper prevention, and convenience.
- Make copies of the "Consumer Choices" Copy Page for each team.

PART a - TAKING A CLOSER LOOK

1. Set out the examples of packaging that you brought in. Discuss each package and the product it contains (or contained) with the entire group. Use the questions on the "Consumer Choices" Copy Page.
2. Ask students why they think each product is packaged the way it is. (cost, ease in shipment,

5-8
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Guide

public health, protection from damage) Ask them what the pros and cons are of each package in terms of protection, bulkiness, tamper resistance, recycled materials and so forth.

PART B - PICK A PRODUCT

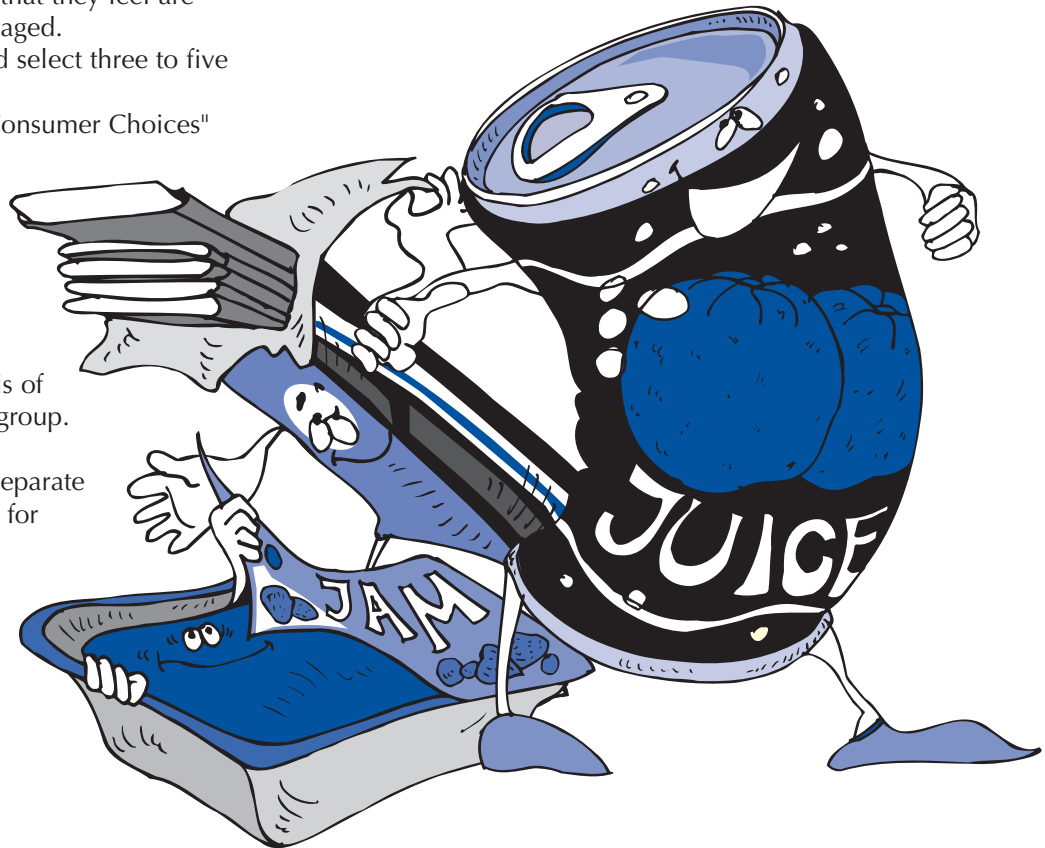
1. Ask students to bring in two packages that they feel are properly packaged, and two that they feel are improperly or insufficiently packaged.
2. Have students work in teams and select three to five items to evaluate.
3. Give each team a copy of the "Consumer Choices" Copy Page for each item they will evaluate. Have students work together to complete the questions. Point out how to tell whether a product is made from recycled material. (Look for recycled sign.)
4. Have each team share its analysis of one product with the rest of the group.

You might suggest that team members separate their examples into two categories, one for

packaging they think could be improved and one for packaging that seems fine the way it is.

Assessment Opportunity

Have students create an ideal package out of art materials or recycled home and school items for one of the products they evaluated. Then have them make a presentation on why their package suits their product. Evaluate the proposed package.



Outside In

Did you know that many of our insects are action-oriented recyclers? Some varieties of wasp build paper combs beneath eaves and overhangs, whereas hornets and yellow jackets build tiers of combs enclosed with a tough paper covering and hung in a tree. These insects get their paper by chewing up – "recycling" – weathered and rotting wood, dead stems, bark or man-made paper and cardboard and mixing it with saliva to make a pulpy mass. They can shape it to any form and it dries into a very tough "paper" nest.

Other wasp species are "reducers." For example, the Velvet Ant looks for bee larvae and lays one egg next to each developing bee. When the ant eggs hatch, they eat the bee larvae. Cicada Killers, another wasp species, wander outdoors during the summer, looking for cicadas to paralyze with their stinger and take back to their nests to feed their young. Although these practices may sound negative, in reality, these reducers help keep our insect populations in balance.

CONSUMER CHOICES

OBSERVE your product closely. DISCUSS the following questions with your team.

ANSWER the questions as best you can, using your team's knowledge and the information given on your product.

PRODUCT NAME

TYPE OF PRODUCT

LOCATION OF PRODUCER

SHIPPING DISTANCE

NET WEIGHT OF CONTENTS

1. Describe all parts of the packaging.
2. Is the amount or type of packaging influenced by the manufacturer's need (e.g., federal labeling regulations) or desire to include product information and labeling?
3. What materials make up the packaging? (How much of it is paper? Plastic? Glass? Metal? Other?)
4. Is the product made of recycled material? Is the packaging?
5. Is the product biodegradable and/or recyclable? Is the packaging?
6. What purpose does each piece of packaging serve? (portion size, health, safety, freshness, anti-theft, advertising, other reasons) You may give several answers.
7. After the product has been used, what is thrown away?
8. Can you think of a better or different way to package the product?

9-12 Water Clean-Up

Adapted from: "Streets to Streams: Youth Investigations into Water Quality," Missouri Department of Conservation

Objectives

In this activity, students will:

- Visualize the process through which water becomes contaminated and partially cleansed
- Discover how difficult it is to remove contaminants from water

Show Me Standards

Performance: 1.3, 1.6, 1.8, 2.1, 2.3, 3.2, 3.3, 4.1, 4.6, 4.7

Knowledge: CA1, 6; HP6; S7, 8

Materials

- 1 liter or quart jar containing 2 cups (1/2 liter) clean tap water
- 1 liter or quart jar of water contaminated with:
 - ✓ 3 tablespoons (45 ml) dark vegetable oil (simulates motor oil)
 - ✓ 2 tablespoons (30 ml) leaf litter or compost (sewage)
 - ✓ 1 teaspoon (5 ml) sand/mud (erosion)
 - ✓ 5 drops dish detergent (soaps)
 - ✓ 3 drops food coloring (hazardous waste)
 - ✓ 1 tablespoon (15 ml) garbage (garbage)
- washbasin containing the following:
 - ✓ 2 coffee filters
 - ✓ 1 six-inch square of fine screen
 - ✓ 1 eye dropper
 - ✓ 1 spoon
 - ✓ 3/4 cup (175 ml) clean sand
 - ✓ 1 medium size funnel
 - ✓ 1 sponge
 - ✓ 2 clear jars to hold "cleaned" water
 - ✓ empty container (yogurt cups) to hold removed contaminants
 - ✓ paper towels for messes

Preparation

- Before class, prepare contaminated water for each small group, reserving one container to prepare before students as a demonstration.
- Prepare a master list of contaminants on an overhead or flipchart that includes the following substances:

yard wastes, cigarette butts, paint, pet wastes, motor oil, antifreeze, food and cleansers.

Procedure

1. Organize the students into small groups. Ask each group to brainstorm a list of substances that might contaminate water.
2. Have the students share their lists with the class. Then compare their lists to the master list you prepared before class.
3. Prepare to contaminate one water sample in front of them. As you go over each type on the master list, add a representative contaminant to the water sample.
4. Distribute materials to each group.
5. Tell students to clean up their own sample of contaminated water providing the following guidelines:
 - 20 minutes to restore the contaminated water to its original clean drinkable state.
 - Pour all liquids over the wash basin to contain spills.
 - Everyone on the team must have a chance to help clean the water.
 - Before cleanup begins, teams must write their cleanup steps on a blank sheet and show teacher.
 - Use only the supplies in the wash basin at the work station.
 - Discuss with your team what equipment will work best for cleaning each contaminant. Write the order in which you plan to use the equipment.
 - When done, place a sample of the cleaned water in a clear jar to show the class. Place any waste removed from the contaminated water in the empty container.
 - Team will report to the class successes and difficulties encountered.
6. If necessary, guide students in brainstorming ways they might use the materials provided to cleanse their water. Review each group's plan and do not attempt to direct their procedure beyond encouraging them to try all the equipment. They will learn from their successes or failures.
7. After all groups have completed their clean up and reported their results to the class, ask the following questions to stimulate discussion. These are opinion questions, so there are no wrong answers:



- What methods worked best to clean the water?
 - Which contaminants were hardest to remove?
 - Which were easiest?
 - Were you able to remove everything?
 - If not, why not?
 - What equipment or supplies do you wish you had?
 - Only three drops of food coloring were added, yet the color was hard to remove. What does this tell you about hazardous substances in the environment?
 - Did any of the groups try to dilute their sample? Did it get rid of the color?
8. Ask students:
- Do all household hazardous products have safer alternatives? (No.)
 - What is the best approach in this case? (Buy only the quantity needed, use and store safely, recycle if possible or dispose of properly.)

Moving From Awareness to Action - Making an Action Plan

1. Lead your class in a brainstorming activity about how they can prevent water contamination. (Some areas to cover include trash, cars, gardens, pets, recycling and disposal.)
2. Write the ideas on a board or flipchart. As a class or homework assignment, have the students develop their own personal action plan containing the following points: my goal in reducing water contamination; date by which I will do this; obstacles to achieving my goal; what I'm apprehensive about; my strengths in this effort; from whom/where I could get support; what I need more information about; how I will know I have reached my goal.
3. Lead a class discussion of their plans, creating a master table on the board or flipchart, listing goals, obstacles and strengths.
4. Call attention to the combined strengths and then brainstorm ways to overcome the identified obstacles.

Extended Learning

1. Have students research and develop guided imagery narratives that follow water through industrial, pristine, natural and agricultural settings.
2. Have students create an expression (artwork, poem, rap, skit, song or video) demonstrating the similarities and differences between the processes they tried in the lab and the way wastewater from their homes is treated (septic tank or municipal treatment plant).
3. Have students get their parents' help to inventory products in their own home, reading labels and indicating which might threaten stream life if they went down a storm drain.
4. Have students investigate and demonstrate safer cleaning alternatives for common household cleaning products including baking soda, salt, vinegar, lemon juice, etc.

reduce!
reuse!
recycle!

